Amendments to the claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

Claims 1-76 (cancelled).

77 (currently amended): A method for analyzing a sample involving detecting radiation from particles or molecules in a measurement volume of the sample, the method comprising the steps of:

- measuring by detection means, in a repetitive mode, a number of photon counts per time interval of defined length,
- determining an experimental distribution function of the number of photon counts measured per time interval,
- determining a distribution function of specific brightness of the particles or molecules based on the experimental distribution function of the number of photon counts measured, by fitting an expected distribution function of the number of photon counts against the experimental distribution function of photon counts, wherein the expected distribution

function of the number of photon counts is calculated using characteristics of a spatial brightness function by

~~employing values of volumes of sections of the measurement volume corresponding to a selected set of values of the spatial brightness function and considering the volumes as variables depending on modeling parameters of the spatial brightness function and~~

i) defining the spatial brightness function by a set of modeling parameters,

ii) selecting a set of values to characterize the spatial brightness function,

iii) expressing a set of volumes of sections of the measurement volume as functions of the modeling parameters, where the set of volumes corresponds to the set of values, and

iv) selecting the values of these modeling parameters which yield the closest fit between the experimentally determined and the expected distribution of the number of photon counts.

78 (previously presented): The method according to claim 77, wherein radiation from particles or molecules in one or more measurement volume(s) is measured.

79 (previously presented): The method according to claim 77, wherein the detection means is part of a confocal microscopic set-up further having:

- at least one microscope objective having an image plane for both focusing an incident laser beam and collecting radiation emitted, scattered and/or reflected by the particles or molecules of the sample,
- a dichroic mirror,
- a pinhole in the image plane of the microscope objective,
- and data acquisition means.

80 (previously presented): The method according to claim 79, wherein dimensions of the pinhole are used as a modeling parameter of the spatial brightness function.

81 (previously presented): The method according to claim 79, wherein the incident laser beam has a convergence angle used as a modeling parameter of the spatial brightness function.

82 (previously presented): The method according to claim 79, wherein the confocal microscopic set-up further comprises means for scanning and/or moving the sample.

83 (previously presented): The method according to claim 79, wherein the at least one microscope objective has a numerical aperture = 0.9.

84 (previously presented): The method according to claim 77, wherein the particles are molecular aggregates, complexes, vesicles, cells, viruses, bacteria, beads, or mixtures thereof in solids, liquids or gases.

85 (previously presented): The method according to claim 77, wherein the particles or molecules can be grouped into species distinguished by their specific brightness.

86 (previously presented): The method according to claim 85, wherein at least one of the species is luminescent.

87 (previously presented): The method according to claim 85, wherein at least one of the species is luminescently labeled.

88 (previously presented): The method according to claim 85, wherein at least one of the species is fluorescent.

89 (previously presented): The method according to claim 77, wherein the particles carry binding sites for luminescent molecules.

90 (previously presented): The method according to claim 78, wherein the sample has a volume, and the measurement volume is less than the volume of the sample.

91 (previously presented): The method according to claim 90, wherein the measurement volume is = 10-12 l.

92 (previously presented): The method according to claim 90, wherein the particles or molecules move into and out of the measurement volume during measuring.

93 (previously presented): The method according to claim 90, wherein the particles or molecules are optically scanned.

94 (previously presented): The method according to claim 78, wherein the measurement volumes are arranged two-dimensionally.

95 (previously presented): The method according to claim 94, wherein the measurement volumes are arranged on a membrane or a sheet having wells.

96 (previously presented): The method according to claim 78, wherein the measurement volume is restricted by the use of elements of near field optical microscopy, or elements of near field optical microscopy in combination with conventional microscopy optics.